

Meeting Date: March 22, 2004
Date Prepared: March 23, 2004

**MULTI-AGENCY RADIATION SURVEY AND SITE INVESTIGATION MANUAL
(MARSSIM) WORKGROUP MEETING NOTES - DRAFT**

MONDAY, March 22, 2004

ATTENDEES:

U.S. Environmental Protection Agency - OSWER/ERT-West: C. Petullo
U.S. Environmental Protection Agency - Headquarters: K. Klawiter
U.S. Environmental Protection Agency - Headquarters: L. Bender
U.S. Environmental Protection Agency - Region II: N. Azzam (phone)
U.S. Nuclear Regulatory Commission - RES: R. Meck
U.S. Nuclear Regulatory Commission - RES: G. Powers
U.S. Nuclear Regulatory Commission - NMSS: J. DeCicco
U.S. Air Force: R. Bhat
U.S. Air Force: Major D. Caputo
U.S. Navy: S. Doremus
U.S. Department of Energy (DOE/EM): A. Williams
U.S. Department of Energy (DOE/EH): E. Boulous
U.S. Department of Homeland Security (formerly DOE/EML): C. Gogolak

MEMBERS OF THE PUBLIC:

Cabrera Services, Inc.: S. Hay (U.S. Air Force Contractor)

DISCUSSION

C. Petullo opened the meeting. The Workgroup agreed to change the dates of the May meeting to May 17 through May 21, 2004. The minutes from the February meeting were reviewed and comments from the database discussed. S. Hay was tasked with finalizing the minutes.

D. Caputo told the Workgroup about ANSI N13.49, Performance and Documentation of Radiation Surveys. The document has a limited scope and provides generic guidance, but should be included as a reference to MARSAME.

G. Powers suggested that the guidance in Appendix B be more definitive and thorough, and provide a complete list of references on radionuclides in background. This work would slow down development of the document, so was not given priority by the Workgroup. D. Caputo

suggested getting feedback during the interagency and public reviews, and providing a typical range of concentrations along with a high or maximum value. K. Klawiter volunteered to contact the EPA NORM group to provide additional references. J. DeCicco stated that his group is looking at determining background, not providing examples of background.

The Workgroup discussed action items from the February Workgroup meeting. The DOE contact for the advance notice of preliminary rule making (ANPRM) on RCRA C landfill disposal of radioactivity is Gustavo Vasquez, Patricia Eng is the NRC contact, and Dan Schultheiz represents EPA. The Workgroup members were tasked with obtaining phone numbers for these contacts. K. Klawiter informed the Workgroup that the background for the new MARSSIM Workgroup logo was white and did not work with the background on the MARSSIM website. Work is proceeding on developing a logo with a transparent background. S. Doremus and D. Caputo stated that the DOD contact for signing MARSAME will be the Executive Agent for Low Level Radioactive Waste. Mr. Fats is a Deputy Undersecretary in the DOD Environmental Office working for the Army, and is an SES. C. Petullo will participate in an ISCORS conference call and report back to the Workgroup.

K. Klawiter provided an update on the MARSSIM website. The announcement welcoming DHS as a member of the MARSSIM Workgroup was posted. The error in the FAQ figure was corrected. Issues with obtaining a new MARSSIM logo with a transparent background are being resolved.

C. Gogolak requested feedback on the MARSAME review website. He requested that all Workgroup members provide him with a list of functionality requests to be implemented for the Interagency Review by March 31, 2004. The list of requests provided during the discussion includes:

- ability to create passwords
- ability to view all comments from one agency
- ability to edit compiled agency comments (but retain original comment separately)
- ability to provide a final list of approved agency comments

FAQ ON QUANTITATIVE SCANNING

C. Gogolak provided a draft FAQ covering release of real property under MARSSIM using only scanning measurements. The draft is technically sound but requires editing. The Workgroup suggested answering the questions in the FAQ directly. For example, the response to the first question may be “No additional data are required if the scan data meet the objectives of the survey.” One additional question was suggested, “I have USRADS (or other position correlated scanning) data, do I need to use MARSSIM?” The FAQ should include the assumption that the scan MDC is less than the $DCGL_w$.

The FAQ should include the idea that improved scanning techniques and documentation have resulted in data that are more quantitative. The difference between using a statistically-based number of samples (or direct measurements) and scans described in MARSSIM and scan-only surveys is primarily uncertainty in scan data relative to sample or direct measurement results. The documentation for scan-only surveys may need to include a description of the data distribution (e.g., uncertainty of variance, average or median, or number of results exceeding an investigation level like the $DCGL_{EMC}$).

Another topic of concern was determining the largest area of a survey unit that does not need to be scanned for a scan-only survey. Class 1 areas require 100% coverage, but the required percent scan coverage for Class 2 and Class 3 is problematic, especially when trying to apply the scan-only concepts to MARSAME. It may be very difficult to lay out a grid for sample locations on a piece of equipment or pile of material. The purpose of the FAQ is to cover scan-only surveys for real property using MARSSIM, and is not intended to apply to MARSAME.

There were discussions concerning whether scan-only surveys could be used to demonstrate compliance with a release criterion using MARSSIM guidance. Workgroup members were tasked with identifying technical issues for not performing scan-only surveys and provide them at the May Workgroup meeting or provide them as comments on the revised FAQ.

CHAPTER 3 COMMENTS

Copies of the comments on Chapter 3 were provided to the Workgroup. The Workgroup discussed the use of the terms “action level”, “release criterion”, “regulatory criterion”, “disposition criterion”, “derived concentration guideline level”, etc. The Workgroup decided to use the generic terms “action level” and “disposition criterion” (or “criterion for disposition”) for the next set of draft chapters. The contractor will conduct a global search of Chapter 3 (and other chapters) for gratuitous use of the word “residual,” as in “residual radioactivity” and determine if the language needs revision.

Section 3.2 should state that a disposition criterion may include multiple decisions (e.g., removable and total activity for DOE 5400.5) which require separate action levels.

Section 3.2.1 currently covers two topics: sources of action levels, and the interface between development of an action level and survey design. This section should mention that assumptions about accessibility need to be considered at this point, and reference Sections 2.5 and 3.3.1 (or other discussions of accessibility).

Section 3.2.2 should refer to Chapter 2 for the list of potential contaminants of concern. Section 3.2.4 should focus on developing surrogate relationships and developing the final list of contaminants of concern (no longer potential).

103 Section 3.2.3 should state that when the disposition criterion is for surface activity, the survey
104 should demonstrate the activity is actually on the surface, or the survey design should
105 demonstrate that the assumption the activity is on the surface is conservative or restrictive. For
106 other situations the selection of a measurement technique may drive the survey design. The
107 Workgroup discussed the example of ^{60}Co on bolts using DOE Order 5400.5 for release. The
108 relationship between surface area and volume should be developed. Converting the results to the
109 proper units (i.e., surface area or mass) allows the user to determine which approach is most
110 restrictive. An example of surface activity on foil compared to surface activity on a metal plate
111 was used to illustrate the difference between surface area that may be restrictive compared to
112 when volume or mass may be restrictive. Another example of measuring dry active waste
113 (DAW) at power plants was used to describe combining surface measurements of beta activity
114 with volumetric measurements of gamma activity to verify assumptions about surface and
115 volumetric activity. NUREG-1640 describes a method for estimating surface area for objects
116 that will need to be integrated into MARSAME. On lines 211 to 219, use the terms known,
117 unknown, and less well known instead of certain and uncertain.

118 Section 3.3 is called Identification of Survey Units, but the guidance only looks at factors that
119 influence defining survey units. One additional consideration when determining the size of
120 survey units is included in assigning tolerable limits on decision errors. Decision errors include
121 incorrectly releasing M&E that results in unacceptable exposures, incorrectly remediating when
122 something is already clean, incorrectly disposing of M&E and using up space in landfills, and
123 incorrectly refusing to accept M&E when it is really clean.

124 ADJOURN

Meeting Date: March 23, 2004
Date Prepared: March 29, 2004

**MULTI-AGENCY RADIATION SURVEY AND SITE INVESTIGATION MANUAL
(MARSSIM) WORKGROUP MEETING NOTES - DRAFT**

TUESDAY, March 23, 2004

ATTENDEES:

U.S. Environmental Protection Agency - OSWER/ERT-West: C. Petullo
U.S. Environmental Protection Agency - Headquarters: K. Klawiter
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MEMBERS OF THE PUBLIC:

Cabrera Services, Inc.: S. Hay (U.S. Air Force Contractor)

CHAPTER 3 (continued)

The Workgroup continued reviewing comments on Chapter 3.

The Workgroup discussed the description of survey units. Survey unit identification in MARSAME is based primarily on the dose or risk modeling assumptions, the regulatory area averaging requirements, or the final disposition option. The actual survey unit boundaries are modified based on physical properties of the materials and equipment, measurability, etc. The contractor will develop a list of modifying variables for the next revision to Chapter 3.

Line 552, increased variability results in more uncertainty in the disposition decision. More data may be needed to reduce the uncertainty to tolerable levels.

The discussion of surface versus volumetric activity should include the idea that the decision as to whether the activity is on the surface or is volumetric may be determined by the action level, or vice versa. The survey design should demonstrate the relationship between the two, and show that the action level and decision as to whether the activity is surface or volumetric is technically defensible and acceptable to the stakeholders.

The responsibility for defining the difference between surface and volumetric activity lies with the regulatory authority setting the disposition criterion. R. Meck pointed out that most times the user “knows” if activity is surface or volumetric (e.g., fertilizer is volumetric, most metal that is not activated is surface). Based on the results of the IA, the user should assume surface activity unless data indicate otherwise. Modifiers for this assumption include bulk material (volumetric by definition), permeability, and porosity. If there is a mixture of surface and volumetric activity, or if the location of the activity is unknown, the user should assume the more restrictive case.

To determine which is more restrictive:

1. Estimate total surface area (see NUREG-1640)
2. Estimate total volume or mass (may be required to separate different materials)
3. Multiply surface action level by surface area to calculate total surface activity
4. Multiply volume action level by volume to calculate total volume activity.

The lower total activity defines the most restrictive action level.

INTERDICTION AND SCENARIO B

The concept of interdiction was discussed by the Workgroup to determine how these types of surveys may impact the development of MARSAME. Interdiction surveys start with the M&E in an uncontrolled environment. For many surveys, physical control of the M&E will be initiated before an interdiction survey can begin. The possible results of an interdiction survey are continued unrestricted use, initiation of radiological controls in addition to the physical control already in place, or a failure to accept continued physical control of the M&E (i.e., turning back a truckload of scrap metal from a recycling facility). Interdiction surveys will almost always result in the same or higher level of radiological control following the survey. Release surveys will almost always result in the same or lower levels of radiological control following the survey.

Scenario A and Scenario B (as defined in MARSSIM Appendix D) are independent of the terms release and interdiction. The null hypothesis for Scenario A is the activity associated with the M&E exceeds the action level. The burden of proof is on the owner, who should provide evidence the activity is below the action level before the M&E is considered to be clean. Scenario B assumes the activity associated with the M&E is below the action level, and the

burden of proof is on the regulator (or person potentially accepting the M&E). Evidence that the activity exceeds the action level should be provided before the null hypothesis is rejected.

If the action level is zero incremental activity, Scenario B is the only reasonable option. Because interdiction surveys are often associated with this type of action level (i.e., indistinguishable from background), Scenario B is often associated with interdiction surveys. However, interdiction surveys can be performed with action levels other than zero.

The contractor was tasked with providing a definition for interdiction in the revised glossary for the next MARSSIM Workgroup meeting in May.

CLASS 2 M&E

The Workgroup discussed classification and the purpose of Class 2 surveys in MARSAME. C. Gogolak provided background on the origins of classification and Class 2 surveys. Draft NUREG-5849 defined two classes of areas, affected and unaffected. Affected areas received essentially Class 1 surveys. Unaffected areas received essentially Class 3 surveys. During the development of MARSSIM, people performing surveys indicated that there were a lot of surveys being performed in areas that could not be called unaffected, but had levels of residual radioactivity below the action level. Performing affected area surveys in these areas was driving up the cost of final status surveys. MARSSIM introduced Class 2 areas as something between affected and unaffected, with a medium level of survey effort.

Classification is the application of the graded approach in MARSSIM. The number of measurements required to make a technically defensible decision is based on the requirements of statistical tests. Classification is used to vary the area over which the measurements are performed, allowing for changes in measurement density. In MARSSIM, Class 1 has the highest potential for activity levels that exceed the action level, and the survey units have the smallest area. This results in the highest measurement density, and the highest level of survey effort.

MARSSIM also allows flexibility in the percent area scanned based on classification, which is another application of the graded approach. Class 1 areas have the highest potential for small areas of elevated activity, so scans are required over 100% of the accessible surfaces. Class 2 and Class 3 areas allow for lower percentages of area to be scanned. The selection of the percent area scanned is based on professional judgment.

Survey unit size in MARSAME is tied most closely with the action level. Survey unit size may be modified based on physical characteristics of the M&E. It is unlikely that survey unit size will change based on the potential level of activity. Classification may not provide an equivalent graded approach to MARSSIM. The Workgroup discussed varying scan coverage as a method for implementing the graded approach in MARSAME. R. Meck suggested that the graded

224 approach is also applied in the selection of a disposition option early in the survey design
225 process.

226 MARSSIM also introduced the concept of areas that do not require any type of radiological
227 survey, non-impacted areas. The division between impacted and non-impacted areas is different
228 from the division between Class 1, Class 2, and Class 3 areas. The Workgroup discussed the
229 possibility of applying the term categorization to the impacted or non-impacted decision, and
230 classification to determine the level of survey effort using a graded approach. The Workgroup
231 decided to have the discussion at a future meeting.

232 ADJOURN

Meeting Date: March 24, 2004
Date Prepared: March 30, 2004

**MULTI-AGENCY RADIATION SURVEY AND SITE INVESTIGATION MANUAL
(MARSSIM) WORKGROUP MEETING NOTES - DRAFT**

WEDNESDAY, MARCH 24, 2004

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CHAPTER 4 COMMENTS

The Workgroup reviewed the database comments on the draft outline for Chapter 4, beginning with a discussion of the components of each section in the proposed outline.

The first component is defining the target population, or defining what will be measured. The guidance should describe how to divide M&E into target populations that correspond to the survey unit. The target population is drawn from the survey unit, and is tied to the boundaries defined for the survey unit. For example, the target population may be defined as the surface activity for the M&E being investigated. The target population could also be defined as some thickness starting at the surface, or as the entire volume. The guidance should start with the selection of a disposition option. In some cases, the action level will be defined by the

disposition option, and the assumptions used to develop the action level will define the target population. In other cases, the disposition option combined with historical information about the M&E will define the characteristics of the radioactivity that will be used to define the target population. Together, this information supports the selection of the action level.

The second component is defining the spatial boundaries, or defining where measurements will be performed. Many of these considerations are included in the rule making or development of action levels. These boundaries may represent management or political decisions. MARSAME is a technical guidance document, and the technical decision should focus on optimizing the survey design and selecting between options. There is a possibility that there could be more than one survey design that meet the DQOs, but the designs will be very different in terms of cost and how they address the DQOs. Guidance should be provided at the end of Chapter 4 or early in Chapter 5 that there are intangibles that need to be considered. Examples include lingering concerns at brownfield releases and delays in transferring property.

Defining temporal boundaries, or when measurements will be performed, is another component. Topics to be considered include periodic fluctuations in temperature and background, instrument response (i.e., short vs. long response times), and how often the response checks should be performed (quality control).

The Workgroup discussed cost issues that should be included in MARSAME. Some issues may be discussed in Chapter 1 or Chapter 2, while others may not be appropriate until Chapter 5. Intrinsic value of the M&E, how much is it worth, should be considered. Another consideration is avoided cost, when the M&E can be reused or recycled instead of being thrown away. There is limited space available for disposal, which should be accounted for when considering the total cost of disposal as a disposition option. There should be a discussion of direct economic cost compared to indirect economic cost.

MARSAME STRUCTURE

The Workgroup discussed options for restructuring MARSAME. The current (revision 5) versions of Chapter 3 and Chapter 4 have similar structures. Following the review of comments on Chapter 4, the Workgroup discussed the possibility of combining these two chapters into a single chapter. The proposed structure for revision 6 of the chapters was developed.

Document Objectives - The MARSAME supplement should be a stand-alone document. The guidance should be presented in a linear fashion, with the entire discussion of each subject provided in one section. When a separate subject influences a topic, the supplement should provide specific references to direct the reader to the location of the necessary guidance. The goal of the document is to tell the user how to design a technically defensible survey.

Chapter 1 - Introduction and Overview. This chapter should introduce the concepts new to MARSAME and describe the major differences between MARSSIM and MARSAME. For example, MARSSIM has fixed disposition options for real property (i.e., continued use with radiation present, restricted use to limit exposure, or free release), while MARSAME includes other disposition options such as recycle and disposal. Survey units in MARSAME are driven primarily by the action level, which is defined by the disposition option.

Chapter 2 - Initial Assessment. This chapter should focus on the impacted or non-impacted decision, the physical description of the M&E to be investigated, and the identification of disposal options. Only impacted M&E requires additional investigation. The physical description provides information needed to define survey units as well as determine potential disposition options. Disposition options drive the selection of action levels and overall survey design. Include the example where the portal monitor at a recycle facility has a lower action level than the regulatory criterion based on dose or risk.

Chapter 3 - Inputs to the Survey Design. Basically, this chapter should follow the current structure. The focus should be on action levels, survey unit identification, and selection of measurement techniques. Ideas from the previous version of Chapter 4 that define what (target population), where (spatial boundaries), and when (temporal boundaries) to perform measurements should be included. Guidance should be directed toward developing the decision rule. The decision rule includes a parameter of interest (based on survey unit definition, target population, and average versus elevated measurement comparison), and action level, and alternative actions (based on disposition options). Defining potential measurement techniques may drive the survey design, or the survey design may determine the required MQOs for selection of a measurement techniques in the new Chapter 5 (old Chapter 6).

Chapter 4 - Survey Design. This chapter should focus on five major areas. The first section should finalize the decision rule using the alternatives identified in Chapter 3. There may be multiple decision rules that result in multiple designs. Section two should define the null hypothesis and select either Scenario A or Scenario B. ~~Use~~ Existing guidance from NUREG-1505, NUREG-1761, and EPA QA/G-4 should be used as references. The third section should discuss tolerable limits on decision errors and look at potential consequences of making decision errors. Section four should cover the measurement requirements, and include determining the number of measurements and the percent scan area. The last section will document the survey design in a quality document, and cover optimizing the survey design and selecting between multiple survey designs.

Chapter 5 - Implementation of Disposition Surveys. This chapter should complete the development of the current Chapter 6.

Chapter 6 - Assessment of Disposition Survey Results. This chapter should cover the evaluation and interpretation of survey results, along with documenting the results of the survey in a final

disposition survey report, or documenting the survey using an approved SOP and trained personnel, which is covered in the last section of Chapter 5.

SURVEY DESIGN APPROACH

The Workgroup discussed potential options for developing the survey design section of the new Chapter 4. NUREG-1761 states that the user should try and design a survey that surveys 100% of the M&E. The selected measurement techniques (scan, in situ, box counter, portal monitor) must have a scan MDC less than the action level. If all of the results are less than the action level, then the M&E can be released.

The first discussion focused on what happens when the scan MDC is greater than the action level. One possibility is to use the MARSSIM approach of combining direct measurements or samples with scans. There are potential problems with laying out a measurement grid (see NUREG-1761), radionuclides that are almost impossible to detect (resulting in very high survey costs), and classification as a means of implementing a graded approach. The elevated measurement comparison (EMC) may result in remediation, dose or risk assessment, or selection of alternate disposition option (e.g., reuse or disposal instead of unrestricted release). As in MARSSIM, the problem is not the elevated area found, but the elevated areas missed. The key is to specify the smallest area of concern, since many problems related to dose, risk, the size of the detector, and the instrument response time can influence the size of an area of elevated activity that can be detected.

Consider the case where the M&E is Class 1, 100% of the survey unit is measurable, and the scan MDC is less than the action level. NUREG-1640 is the basis for the action level. Total activity associated with the M&E is the only concern from the model so elevated areas are not a concern. The area factor for NUREG-1640 is infinite. As long as the average activity is less than the action level, the M&E demonstrates compliance with the disposition criterion. However, if DOE Order 5400.5 is the basis for the action level, there is an area factor of three provided by the Order and small areas of elevated activity need to be evaluated. Using a box counter or in situ gamma spectrometry may be acceptable using NUREG-1640, but these measurement techniques may not be adequate for evaluating the EMC requirement of DOE Order 5400.5.

If the scan MDC is less than the action level, there are three possible survey designs. 100% of the survey unit is scanned, if all of the results are below the action level, the user would decide that the activity associated with the M&E demonstrates compliance with the disposition criterion. The user may also have a decision rule where they demonstrate compliance if the average activity is less than the action level (should be documented). The third option is where the average is below the action level and all measurements are below the EMC action level.

370 There are two options available when no area factor is specified as part of the development of
371 action levels. The user may assume the area factor is one, and everything should demonstrate
372 compliance with the action level. The user may also assume the area factor is infinity and focus
373 on the average activity. The selection between these alternatives may be implied by the
374 disposition option even if the area factor is not specified.

375 ADJOURN

Meeting Date: March 25, 2004
Date Prepared: March 30, 2004

**MULTI-AGENCY RADIATION SURVEY AND SITE INVESTIGATION MANUAL
(MARSSIM) WORKGROUP MEETING NOTES - DRAFT**

THURSDAY, MARCH 25, 2004

ATTENDEES:

U.S. Environmental Protection Agency - OSWER/ERT-West: C. Petullo
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CLASS 1 SURVEYS

The Workgroup continued discussing options for designing Class 1 surveys, and developed examples to illustrate different options.

Case 1 - 100% of the survey unit is measured using a technique with an MDC less than the action level. If all of the measurements are less than the action level, the user will decide that the actual activity is below the action level.

Case 2 - 100% of the survey unit is measured using a technique with an MDC less than the action level. Some values are above the action level and some values are less than the action level. If the average is below the action level and all values are below the EMC action level,

then the user will decide that the average activity is below the action level. This method requires an area factor.

Case 3 - 100% of the survey unit is measured using a technique with an MDC less than EMC action level. If the average of a statistically-developed number of measurements with MDC less than action level is less than the action level and the 100% coverage measurement does not result in values above the EMC action level, the user will decide that the average activity is below the action level, similar to MARSSIM Class 1. There is a possibility users that will calculate the confidence in the 100% coverage measurement at the action level, and adjust the EMC MDC using alternative values for the Type I and Type II decision error rates. The convention for MDC calculations is to always use 5% so the MDC values for different methods can be compared directly. This case requires area factors and a method for developing a systematic measurement grid.

Case 4 - The user cannot or does not choose to measure 100% of the survey unit, and the MDC is less than the action level. One example is the windings for an electric motor. The interior areas are difficult to access and require destroying the motor. R. Meck suggested that the user provide reasonable assumptions to determine an upper bound estimate of activity that could be missed by a less than 100% survey. The stakeholders must agree to the assumptions before the M&E may be surveyed and released. C. Gogolak pointed out that this approach is tied to the definition of tolerable levels for making decision errors (i.e., can the user accept a certain amount of risk associated with making the incorrect decision). There was a discussion of trying to include professional judgment, qualitative, and “soft” data in the survey design. C. Gogolak stated that Bayesian statistics allow the user to assume prior information, then collect information to test those assumptions. What is being described does not allow for testing the assumptions, so Bayes’ Theorem cannot be applied. The contractor was tasked with identifying methods for quantifying expert opinion information used by social scientists (e.g., psychology, sociology). The contractor was tasked with developing at least one case study example that includes Case 4 (all cases should be covered by examples).

CLASSIFICATION

The Workgroup discussed assigning a level of confidence for classification of different areas of M&E. The major problem is that there is no incentive to provide a good estimate of confidence. One suggestion was to assign a level of confidence to classification during the IA, so classification should be discussed as part of Chapter 2. Under Case 4, the options for Class 1 M&E are to negotiate with the regulator or dispose of the M&E (which usually requires less survey effort and less confidence in assumptions). The alternative is to come up with a method to quantify classification, or develop another approach equivalent to classification in MARSSIM.

The IA needs sufficient information to support assumptions for covering less than 100% of the M&E during the survey. This implies a known relationship between what is measured and what is not, which is a surrogate approach. The percent coverage may also be related back to the disposition option, such as intermodal containers being sent for disposal to comply with waste acceptance criteria.

D. Caputo asked about confidence testing where the user calculates how many bolts in a bucket need to be surveyed before you decide all of the bolts are acceptable. C. Gogolak had previously investigated this option. He stated that high degrees of confidence required sampling high numbers of items. It becomes the same as sampling on a grid assuming all of the bolts have the same level of activity.

The basis for the percent coverage for scans in MARSAME should be documented. For example, the Workgroup agrees that scanning approximately 10% of Class 3 areas based on professional judgment is acceptable, and Class 1 areas receive 100% coverage. Class 2 would cover everything in between. C. Gogolak will try and develop a method for determining percent coverage based on the relative shift defined in MARSSIM.

The question is whether the coverage (percent measured) is driven by choice or necessity. If the M&E cannot be measured without destroying the object, some additional effort need to be applied to proving that nothing has been missed. This is a judgmental process. If the user chooses not to survey 100% of the M&E, it is necessary to use either a systematic or random method to determine where to survey. In most cases there is a combination of biased (judgmental) and unbiased (systematic or random) measurements.

LESS THAN CLASS 1 SURVEYS

The Workgroup discussed options for designing less than Class 1 surveys, and developed examples to illustrate different options.

Case 1 - The user may measure 100% with MDC less than the action level, but chooses not to. This option requires a known relationship between what is measured and what is not.

Case 2 - Some areas are difficult to access, so the user measures less than 100% with MDC less than the action level. The user should identify some fixed percentage of the survey unit that should be measured, that should still be based on some known relationship between what is measured and what is not.

Case 3 - The measurement MDC is greater than the action level. The user cannot make a decision about any activity levels below the MDC, so some type of measurement must be performed with an MDC less than the action level. However, these measurements still provide data that may be useful in working toward a disposition decision for the M&E being

investigated. One example is scan data for Class 2 and Class 3 areas in MARSSIM. The scan MDC does not have to be below the DCGL, but the results are used to verify the that assumption there are no areas of elevated activity expected in Class 2 or Class 3 areas. K. Klawiter pointed out that this is similar to the sentinel measurements discussed in Chapter 2. The information can be used to disprove an assumption, but additional data are required before a disposition decision can be made. One possible solution is to adjust the MDC (e.g., scan at a slower rate or with a better instrument) or adjust the action level (e.g., select a different disposition option).

Class 2 areas should have a two-pronged approach similar to MARSSIM and Case 3 for Class 1 surveys. There are two questions to be answered. Is the average activity level above the action level? Are there any results that exceed the action level for the EMC? The Workgroup considered using the term “evaluatable” to describe this situation. Class 1 areas need to be 100% measurable, but Class 2 areas need to 100% evaluatable.

The Workgroup also considered the question of whether Class 3 areas could receive no scanning coverage. The contractor will include this question in the appropriate place in Chapter 3 for additional discussion by the Workgroup with the next draft.

CHAPTER 6 COMMENTS

The title of Chapter 6 does not adequately describe what is included in the guidance. The guidance describes more “what” than “how” for implementation. The sections on MDC, MQC, and uncertainty need to be fully developed to include references and lots of detail. A. Williams suggested including a new section on handling M&E to cover flow of M&E, keeping areas clear, cross contamination, segregation of similar M&E, and command and control issues. Manufacturing facility guidelines may offer suggestions for flow issues.

The structure of the guidance should change to discuss individual measurement techniques in separate sections and provide details on each.

The measurement techniques to be discussed are scanning with hand-held instruments, direct measurements with hand-held instruments, automated scanning equipment (conveyorized survey monitors), volume counters (box counters), in situ gamma spec, portal monitor, samples and subsequent laboratory analysis.

The topics to cover in the individual subsections are instruments (descriptions), temporal issues, spatial (size, field of view), radiation types detected, range, scale, uncertainty, detectability (MDC), quantifiability (MQC), and quality control.

General comments included developing a new definition for scanning to state that it is not just for evaluating small areas of elevated activity, which is different than MARSSIM. Background determinations for some instruments may not be available until field activities commence, so

508 expected MDC may not be the same as actual MDC. References to Appendix D need to be
509 moved earlier in the chapter. References to MARSSIM and MARLAP websites should be
510 included early in the document, probably in Chapter 1. The contractor was tasked with finding a
511 copy of the NRC style and writing requirements, *Publishing Documents in the NUREG Series*.
512 The contractor was tasked with performing a survey of commercial laboratory prices for
513 standard radioanalytical procedures.

514 ADJOURN

**MULTI-AGENCY RADIATION SURVEY AND SITE INVESTIGATION MANUAL
(MARSSIM) WORKGROUP MEETING NOTES - DRAFT**

FRIDAY, MARCH 26, 2004

ATTENDEES:

U.S. Environmental Protection Agency - OSWER/ERT-West: C. Petullo
U.S. Environmental Protection Agency - Headquarters: K. Klawiter
U.S. Environmental Protection Agency - Headquarters: L. Bender
U.S. Environmental Protection Agency - Region II: N. Azzam (phone)
U.S. Nuclear Regulatory Commission - RES: R. Meck
U.S. Nuclear Regulatory Commission - RES: G. Powers
U.S. Nuclear Regulatory Commission - NMSS: J. DeCicco
U.S. Navy: S. Doremus
U.S. Department of Energy (DOE/EM): A. Williams
U.S. Department of Energy (DOE/EH): E. Boulos
U.S. Department of Homeland Security (formerly DOE/EML): C. Gogolak

MEMBERS OF THE PUBLIC:

Cabrera Services, Inc.: S. Hay (U.S. Air Force Contractor)

CHAPTER 6 COMMENTS (continued)

The Workgroup continued their discussion of comments on Chapter 6.

Section 6.4 needs a new title. "Conversion" is not the proper term. The evaluation of the measurement results should use terms included in the MARLAP guidance.

Section 6.5 should consider the criticisms of the MDC calculations included in MARSSIM. Concepts and differences between MDC and MQC should be introduced in Chapter 3 in the Section on measurement techniques. C. Gogolak will assist in developing the descriptions of MDC and MQC included in Section 6.5 and Section 6.6.

Section 6.7 on quality control should be tied to individual measurement techniques, e.g., QC for hand-held scanning, QC for in situ gamma spec. The guidance for individual instruments should

be very specific. The need for increased levels of quality control for scan-only surveys should be considered. E. Boulos informed the Workgroup of an expansion of the quality assurance guidance provided in ANSI/ASQC E4 that has been accepted by EPA, DOE, and DOD. The Uniform Federal Policy for Implementing Environmental Quality Systems (EPA-505-F-03-001, DTIC ADA 395303, and DOE/EH-0667) was published in January of 2003 and is available on the Internet at

http://www.epa.gov/swerffrr/documents/intergov_qual_task_force.htm.

MARSSIM WORKGROUP SCHEDULE

The Workgroup scheduled a conference call for April 20, 2004. R. Meck will set up the call from 10 to 2 with 12 lines. The call will discuss the draft minutes from the March meeting, Appendix D from MARSAME, Chapter 1 revision 6, and Chapter 2 revision 6 (time allowing).

The contractor will have Appendix D and draft minutes from the March meeting posted on the review web site by April 2, 2004; Chapter 1 revision 6 posted by April 9, 2004; and Chapter 2 revision 6 posted by April 16, 2004.

The May Workgroup meeting will be held at NRC May 17 to May 21, 2004. One day will be spent discussing each of three chapters, Chapter 3, Chapter 4, and Chapter 5. One half day will be spent on administrative functions (FAQ development, website update, charter, new business, revised schedule, J. DeCicco update). One half day will be spent on technical issues (e.g., uncertainty) and providing guidance on developing Chapter 6. One half day will be spent discussing the development of case study examples.

The contractor will post revision 6 of Chapter 3, Chapter 4, and Chapter 5 along with outlines for some case study examples by May 10, 2004.

The Workgroup scheduled a conference call for June 24, 2004. R. Meck will set up the call from 10 to 2 with 12 lines. The call will discuss comments on Chapter 6 and other topics to be determined at the May meeting.

C. Gogolak will post a draft of Chapter 6 on the review web site by June 21, 2004.

The July Workgroup meeting will be held from July 19 to July 23, 2004 at the NRC. The publishing staff from NRC will be locally available if problems arise concerning publication of the Interagency Review Draft.

ADJOURN

ACTION ITEMS

574

575 576 577 578 579 580 581	All	Obtain phone numbers for Agency contacts for the ANPRM on RCRA C landfill disposal of radioactivity (G. Vasquex - DOE, P. Eng - NRC, D. Schultheiz - EPA - 202-343-9349) Provide requests for functionality of MARSSIM review website for the Interagency Review to C. Gogolak by March 31, 2004. Determine if any hard copies of MARSAME are required for the Interagency Review and if so, how many for each agency, for discussion at May meeting.
582	J. DeCicco	Provide update on NRC guidance development at May WG meeting.
583 584	C. Gogolak	Investigate possibility of relating percent coverage for scan surveys with the relative shift, and report to Workgroup at May meeting.
585 586 587	K. Klawiter	Resolve issues with obtaining MARSSIM logo with a transparent background. Contact the EPA NORM group to provide additional references on sources of background radiation.
588	R. Meck	Set up 12 line conference call for April 20, 2004 and June 24, 2004 from 10 to 2.
589 590	N. Azzam	Continue looking for references for concentrations of naturally-occurring radionuclides present in ceramics for Appendix B.
591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608	S. Hay	Prepare final minutes for the February 2004 MARSSIM Workgroup meeting. Provide revised glossary including a definition for interdiction by May 17, 2004. Provide information on quantifying expert opinion from social scientists (e.g., psychology, sociology) by May 17, 2004. Develop case study examples to include in MARSAME that include four cases for Class 1 areas based on percent measured and MDC (i.e., 100% measure with MDC less than action level and all results less than action level, 100% measure with MDC less than action level and all results less than EMC action level, 100% measure with MDC less than EMC action level, less than 100% measure with MDC less than action level). Include the question "Can scan coverage in Class 3 areas be 0%?" in the next version of Chapter 3. Obtain a copy of <i>Publishing Documents in the NUREG Series</i> for S. Doremus. Perform a survey of commercial laboratories for prices on radioanalytical procedures. Post Appendix D on review website by April 2, 2004. Post draft March meeting minutes on review website by April 2, 2004. Post Chapter 1 revision 6 on review website by April 9, 2004.

609 Post Chapter 2 revision 6 on review website by April 16, 2004.
610 Post Chapter 3, Chapter 4, and Chapter 5 on review website as available, but no
611 later than May 10, 2004.
612 Post outlines and drafts for case study examples on review website by May 10,
613 2004.

614 PARKING LOT

615 Class 3 definition in MARSSIM may need adjustment to cover the “simple” case where the
616 relative shift is very large, which may become the definition of Class 3.

617 Develop an FAQ on classification to decide when an area is Class 2 and not Class 1 or Class 3.

618 Given a classification of Class 2 or Class 3, provide a percent scan to release.

619 Should MARSAME include prior knowledge (process knowledge) to design a disposition survey
620 using a Bayesian approach?

621 Develop a range of expected values for radionuclide relationships that may be used for surrogate
622 measurements.

623 Review the structure of Section 3.2.4.

624 Where are survey unit boundaries finalized, Chapter 3 or (new) Chapter 4?

625 Should the impacted or non-impacted decision be described as classification or categorization?